

# Review of Exponent Laws

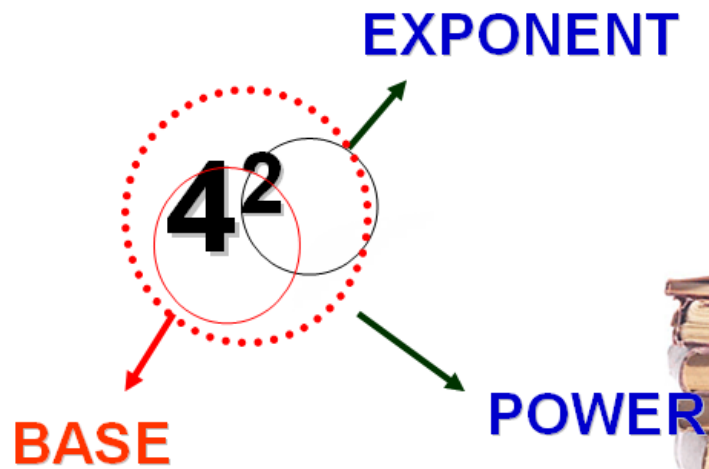
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## MULTIPLYING POWERS



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# POWERS



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## EXPONENT LAW 1

- PRODUCT OF POWERS

- $n^a \times n^b = n^{a+b}$

- Multiplying powers with the same base



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$$n^a \times n^b = n^{a+b} \text{ (Product of Powers)}$$

- To multiply powers with the same base:
- **KEEP THE BASE**
- **ADD THE EXPONENTS**
- **EXAMPLE:**
- $3^3 \times 3^4 = 3^7$



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EXAMPE 2:

$$\left(\frac{-4}{5}\right)^2 \times \left(\frac{-4}{5}\right)^3 = \left(\frac{-4}{5}\right)^5$$

$$(1.1)^3 (1.1)^2 (1.1) = (1.1)^6$$

Exponent of 1  
you don't have  
to show it



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## EXPONENT LAW 2

- POWER OF A POWER

- $(x^m)^n = x^{mn}$

- Multiply the two powers together.

- Example:

- $(5^2)^3 = 5^6$



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EXAMPLE –  $(x^m)^n = x^{mn}$

$$(3^2 \times 3^4)^3$$

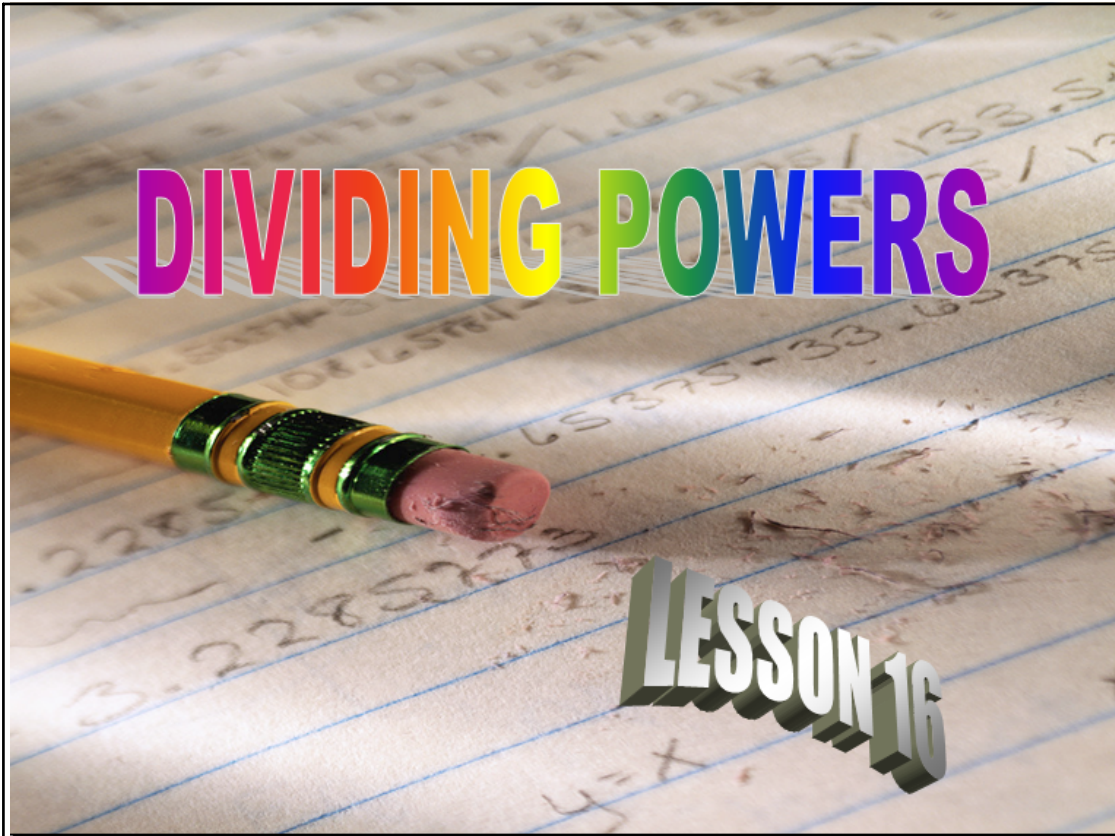
$$= (3^6)^3$$

$$= (3^6)(3^6)(3^6)$$

$$= (3^{18})$$



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## EXPONENT LAW 3

- QUOTIENT OF POWERS

$$\bullet x^a \div x^b = x^{a-b}$$

**Dividing Powers with the  
same base**



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$$x^a \div x^b = x^{a-b} \text{ (Quotient of Powers)}$$

- To divide powers with the same base:
- KEEP THE SAME BASE
- SUBTRACT THE EXPONENTS
- **EXAMPLE:**

$$\frac{3^7}{3^2} = 3^{7-2} = 3^5$$



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TRY THESE

$$4^2 \times 4^3 \div 4^4$$

$$\frac{8^{13}}{8^4}$$

$$\frac{5^4 \times 3^9}{(3^2)^3}$$



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## EXPONENT LAWS #1-3

**Product of Power**       $n^a \times n^b = n^{a+b}$

**Power of a Power**       $(x^m)^n = x^{mn}$

**Quotient of Power**       $x^a \div x^b = x^{a-b}$

You need to have these memorized if you already don't!!!!!!

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## EXPRESS AS A SINGLE POWER

1)  $3^6 \div 3^4$

5)  $\frac{(3^5)(6^2)}{3^2}$

2)  $\frac{3^7}{3^2}$

6)  $\frac{(3^3)(3^4)(5^2)}{(3^2)(5)}$

3)  $\frac{(5^3)(5^4)}{5^2}$

7)  $\frac{(4^3)^2 (4^2)}{(4^2)}$

4)  $(6^3)(7^8)$

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# ZERO POWERS



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## ZERO EXPONENT

$x^0$  is defined to be equal to 1

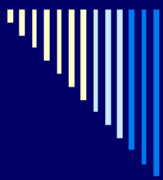
$$x^0 = 1, \text{ where } x \neq 0$$

Exponent Law #4

**Any non zero base raised to the exponent zero equals 1**

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## EXAMPLES

$$3^0 = 1$$

$$(4^2 \times 4^3)^0 = 1$$

$$\left(\frac{3^7}{3^2}\right)^0 = 1$$

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## EXAMPLES:

### ZERO EXPONENTS

$$(-5)^0 = 1$$

$$-3^0 = -1$$

$$(2^0)^3 = (1)^0 = 1$$

$$(-3)^0 = 1$$

$$\left(\frac{2}{5}\right)^0 = 1$$

$$-(3)^0 = -(1) = -1$$

$$(-6^{10})^0 = 1$$

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## NEGATIVE EXPONENTS

$x^{-n}$  is defined to be the reciprocal of  $x^n$

$$\text{That is } x^{-n} = \frac{1}{x^n}, \quad (x \neq 0)$$



Exponent Law #5

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## EXAMPLES

### NEGATIVE EXPONENTS

$$3^{-1} = \frac{1}{3}$$

Remember that a negative exponent does not mean a negative number but the reciprocal number.

$$4^{-3} = \frac{1}{4^3}$$

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## Classwork/Homework

Principles & Process (Orange Text)

Questions Pg.37 #3,4,8,9

Pg.42 #8,11,12

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